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AMSAT's Newsletter for the Amateur Space Program.

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AMSAT and ARRL Propose Second "Ham-In-Space" Mission

A joint AMSAT/ARRL proposal to have a second astronaut "Ham-In-Space" early next year has been prepared and will be forwarded to NASA soon according to AMSAT and ARRL officials. The document proposes that Astronaut Tony England, WØORE, be permitted to operate specific amateur radio equipment from aboard mission 51F/Spacelab-2 scheduled for launch during March, 1985.

The proposal cites the achievements of Owen Garriott, W5LFL, who became the first "Ham-In-Space" last November with his STS-9 mission. The proposal builds on the W5LFL efforts and suggests new and interestng aspects for the 51F mission of WØORE.

Proposed are additional operating bands (including an HF band) as well as new emission types beyond the 2 meter FM voice emissions used exclusively by W5LFL. The 51F effort would differ markedly from the STS-9 activity in other significant ways as well. The WØORE mission, if the proposal is accepted, would be significantly more equipment-intensive than W5LFL's mission which depended on his constant presence and participation in the radio activity.

Neither ARRL nor AMSAT officials would be quoted for the record but *ASR* has learned from reliable sources that some automatic RF equipment was proposed to NASA which would obviate 100% human intervention as was the situation (and constraint) with the W5LFL activity. Officials say they are reluctant to speak for the record because of the preliminary, tentative nature of the negotiations and the desire to avoid raising false hopes should specific aspects of this more ambitious enterprise be unattainable.

Four Years After: Up From the Ashes and Prospering

The 23rd of May marked the fourth anniversary of the ill-fated LO2 Ariane launcher which failed on liftoff and ingraciously deposited AMSAT's Phase IIIA satellite in a shallow, water grave off Devil's Island, French Guiana. The anniversary was marked by a special activity within the regular 75 meter East Coast AMSAT Net beginning at 0100 UTC, 23 May 84.

With Net Control Station WA2LQQ providing a replay of the countdown audio originally transmitted on the ALINS (AMSAT Launch Information Net/Service) four years ago, the scene was set for President Tom Clark's recollection of those infamous, dark moments when it seemed AMSAT, even amateur satellites' future, hung in the balance. W3IWI recalled how it felt sitting in the control room at the Goddard Space Flight Center on what has come to be called Black Friday with W3GEY and W4PUJ close at hand. Tom described those as some of his worst-ever memories.

W3IWI then described how, with laudable encouragement from the members, the organization reconstituted its resolve and determined to forge ahead. Phase IIIB was successfully launched a little over three years later, Tom concluded.

In an especially poignant aspect, Tom noted the replay of the Black Friday launch audio was simulcast on AO-10 in addition to the 75 meter net frequency providing vivid, demonstrative evidence of how far we had come. AO-10 was high over the Atlantic Ocean at the time illuminating much of the Western Hemisphere with its strong, reliable 2 meter downlink.

One wonders if Phase IIIA, now 4 years drowned, heard its progeny calling from above and grieved yet again over skies unflown.

Net Control, Bulletin Stations Sought

AMSAT's Net Manager Wray Dudley, W8GQW, has announced openings for additional Net Control Stations (NCS) and AO-10 Satellite Bulletin Stations.

AMSAT organizes nearly two dozen regularly scheduled on-the-air nets. Their function is to provide timely, useful information for AMSAT members and members-to-be alike. Orbital predictions, news of important operating conditions as well as special events and DX alerts are all grist for the NCS mill. Nets serve local, regional, national or international users and originate with NCS worldwide.

Several HF net billets (positions) have become vacant or will become vacant in the next few months. Net Manager W8GQW is seeking to begin the short training/indoctrination period required in order to phase in the new NCS concurrent with the departure of retiring NCS. In addition, new standby (reserve) stations are needed to fill contingencies

such as travel, illness or storm conditions.

Basic requirements include a viable HF station which can present a competitive signal in the venue in which it is to be employed. For example, doing "battle" on the 20 meter International Net Sundays calls for a linear amplifier, excellent beam and a good tower at least. On the other hand, qualifications for running a local net in a metropolitan area might require only an HT capable of accessing the local repeater.

A reasonable speaking voice and basic familiarity with the subject matter are obvious assets a good candidate would possess. However, the candidate NCS needn't be a technical expert by any means. Nor must he (she) have the voice of Orson Welles (or Helen Hayes). Orbital information will be provided to the NCS regularly.

Related openings exist for Official AMSAT Satellite Bulletin Stations (SBS) too, according to W8GQW. SBS provide essential one-way transmission of important information similar to the function of W1AW. Presently AMSAT has a prototypical service generated by W6KAG and W6CG. These transmissions are heard on AO-10 Mode B. The transmissions appear in the Special Service Channel (SSC) H2, nominally 145.962 MHz. Schedule for the AO-10 SBS service is presently on Mode B days (Monday, Tuesday, Thrusday, Friday and Sunday) from 1 hour prior to thru 1 hour subsequent to apogee whenever apogee occurs with sub-satellite point (SSP) between 60 and 180 degrees west longitude.

East Coast (USA) stations are especially sought says W6KAG who has been supplying the bulk of the uplinking on H2. Butch has been rising at odd hours for months now to provide this valued servce. He suggests because of the irregular hours at which apogee occurs, a retired or semi-retired individual is most likely to succeed with this assignment.

To be an AO-10 AMSAT SBS you need a viable AO-10, Mode B station, a cassette recorder and be willing to undertake a committment of service to the amateur satellite community of a couple of hours per week. Obviously, the more stations that are involved, the more the work can be spread around. Point of contact for these openings is likewise W8GQW.

One of AMSAT's key reasons for being is to provide information on the progress of the Amateur Space program. AMSAT's NCS and SBS system is an essential link in the information chain. If you think you want to be a part of it all on a direct basis, contact W8GQW today. (Wray Dudley, W8GQW, 1617 West McKaig Rd., Troy, OH 45373, 513-339-2254.)

UO-11 Prospects Brighten As Surrey Seeks Answers

Prospects for a successful mission brightened notably when on 14 May UO-11 responded to a telecommand originated at the University of Surrey command station in England. UO-11 had been mute for 10 weeks prior due to unknown causes. However, with the successful command action 14 May, the 2 meter telemetry beacon (145.825 MHz) was activated providing valuable insight to the overall spacecraft condition as well as perhaps clues to the lingering mystery underlying the failure which terminated beacon telemetry on UO-11's third orbit just a few hours after its 1 Mar. 84 launch from Vandenberg AFB, California. UO-11 had failed to respond to numerous command attempts since then.

In status reports since 14 May, Roger Peel, G8NEF, spokesman for the Surrey team, has indicated that while they are pleased with the return of the beacon telemetry and that it provides (at last) a viable tool for delving into the malfunction's root cause, there are additional factors to be dealt with. The reports suggest that the team no longer believes the cause to be attributable to the "cold oscillator" current limiting hypothesis advanced previously. Indicating that the commanding remains far from satisfactory, the group suggests a possible temperature-related effect connected with the command decoder. While still very tentative, there has been some indication from telemetry that the command decoder works less reliably as temperature approaches −11C from about −5C. Surrey is testing this hypothesis against observed "commandability". They have added an additional diagnostic tool to their arsenal with the implementation of a so-called "digital loopback" or echoback scheme. Using this tool they listen to the 2 meter downlink telemetry as it "regenerates" the command uplink as heard by UO-11. Thus they are able to learn very quickly how/if each command sequence is received and processed by the command decoder module.

It is possible a combination of causes is making commanding UO-11 more difficult and intermittant than it should be. The tumbling motion and QRM from radars may also enter the picture.

Surrey indicates it will take at least a month to sort things out, get to the bottom of the current situation and determine a suitable workaround plan. Meanwhile, they intend to proceed extremely cautiously in order to avoid extinguishing the best candle they have to probing the mystery: the 2 meter beacon telemetry. Given that, several of their resident bright minds, a little time and continued encouragement and support and UO-11 may well yet fulfill its ambitious destiny: potentially one of the most significant amateur space and space education tools ever conceived.

G3IOR, G4CUO Claim First Crosslink QSO With AO-10

Using a combination of AO-10 and RS-6, G3IOR and G4CUO have laid claim to a significant first. The duo claims that on 7 May they became the first ever to establish contact using a two satellite relay of which AO-10 was an element. (A two satellite relay was first accomplished using AO-6 and AO-7 nearly a decade ago.)

Both stations used the now classic Mode B-to-Mode A relay, the QSO occurred between 0705 and 0711 UTC on 7 May with signal reports of 559 exchanged for a full two-way, two-satellite QSO.

With an uplink to AO-10 of about 435.085 MHz, RS-6 picked up the 145.920 MHz AO-10 downlink. RS-6 then retransmitted the cw signal on its 10 meter downlink at

29.413 MHz. Both satellites were over North Africa at the time.

Crosslinks may become important to future OSCAR users as geo-stationary systems of global coverage satellites are envisioned for later in this decade. An alternative to inter-satellite linking is to use a terrestrial relay for traffic destined for another coverage zone.

UoSAT-2 Engineering Data

The following engineering data was reduced by KA9Q from data captured by WA2LQQ beginning at 0202 UTC, 21 May 1984.

```
UOSAT-2          00025930065545

Date: 02/59/00 Time: 06:55:45 Day of wk: 3

0018900148450217730351610405450504103602510725130003830980315

00189:  621.300 mA Solar array current -Y
01454:  -60.813 uT Nav mag X axis
02177:  -42.343 uT Nav mag Z axis
03516:    8.751 uT Nav mag Y axis
04054:    0.000 sun sensor
05041:    0.000 sun sensor
06025:    0.000 sun sensor
07051:    0.000 sun sensor
09038:    0.000 sun sensor
05031:    0.000
10517211337712000313075014000515000416000371627518664D195872

10517:   -1.900 mA Solar array current +Y
11337:   -2.029 C  Nav mag (wing) temp
12003:    0.000 horizon sensor
13075:    0.000 (spare)
14000:  -10.507 mA  DCE ramunit current
15000:  -93.550 mA  DCE cpu current
16000:  -57.762 mA  DCE gmem current
17627:  -29.400 C  Facet temp +X
18664:  -36.800 C  Facet temp +Y
19567:  -21.400 C  Facet temp +Z
20519F2106362266002300012400172500072610362763002857802953 94

20519:   -5.700 mA Solar array current -X
21063:   61.110 mA +10v line current
22660:    9.900 V  PCM voltage +10v
23000:  -70.000 mA P/W logic current (+5v)
24001:    0.215 mA P/W geiger current
25000:    0.000 mA P/W elec sp.curr (+10v)
26103:    9.579 mA P/W elec sp.curr (-10v)
27630:  -30.000 C  Facet temp -X
28578:  -19.600 C  Facet temp -Y
29539:  -11.800 C  Facet temp -Z
30482D3103763228383300003400073531403637453744153851783952 1C

30482:   64.600 mA Solar array current +X
31837:   17.760 mA -10v line current
32283:  10.188 V  PCM voltage -10v
33000:    0.000 mA 1802 comp curr (+10v)
34000:    0.000 mA Digitalker current (+5v)
35314:  510.000 MW 145mhz beacon power o/p
36374:   82.200 mA 145mhz beacon current
37441:    7.800 C  145mhz beacon temp
38517:   -7.400 C  Command decoder temp (+Y)
39521:   -8.200 C  Telemetry temp (+X)
40768D41000542676143000744168F45000146000247504248527C494676

40768:   25.200 V  Solar array voltage (+30v)
41000:    0.000 mA +5v line current
42676:    5.678 V  PCM voltage +5v
43000:    0.000 mA DSR current (+5v)
44168:  154.560 mA Command rx current
45000: -200.000 MW 435mhz beacon power o/p
46000:    0.000 mA 435mhz beacon current
47504:   -4.800 C  435 mhz beacon temp
48527:   -9.400 C  P/W temp (-x)
49487:   -1.400 C  P/W BCR temp
5062151071252678E53684C54959455000056000357517158507F595171

50602:  783.200 mA Battery charge/dischg current
51071:  355.000 mA +14v line current
52678:   14.238 V  Battery voltage (+14v)
53684:    0.000    Battery cell volts (mux)
54959:   19.180 mA Telemetry current (+10v)
55000:    5.208 mW 2.4GHZ beacon power o/p
56000:    0.000 mA 2.4GHZ beacon current
57517:   -7.400 C  Battery temp
58507:   -5.400 C  2.4GHZ beacon temp
59519:   -7.800 C  CCD imager temp
60800E615BC562800C6302436400026500036 6C00C67000168000E69000F

81: 1 145 MHZ general downlink power          off/on
02: 0 435 MHZ engineering downlink power      off/on
03: 0 2401 MHZ engineering downlink power     off/on
04: 0 Telemetry channel mode select           run/dwell
05: 0 Telemetry channel dwell address load    off/on
06: 0 Telemetry channel dwell address source  gnd/computer
07: 0 Primary spacecraft computer power       off/on
08: 0 Primary spacecraft computer error count bit-1
09: 0 Primary spacecraft computer error count bit-2
10: 0 Primary spacecraft computer bootstrap   prom/uart
11: 0 Primary spacecraft computer error count bit-3
12: 0 Primary spacecraft computer bootstrap   a/b
13: 0 Gravity gradient boom deployment pyros  safe/arm
14: 1 Gravity gradient boom deployment pyros  hold/fire
15: 0 Gravity gradient boom deployment        safe/arm
16: 1 Gravity gradient boom deployment        hold/deploy
17: 1 Gravity gradient boom deployment        extend/retract
18: 0 Attitude control magnetorquers          safe/arm
19: 1 Attitude control magnetorquer -x        on/off
20: 1 Attitude control magnetorquer -y        on/off
21: 1 Attitude control magnetorquer -z        on/off
22: 1 Attitude control magnetorquer           reverse/forward
23: 0 435 MHz FSK mode                        NRZI/NRZIC
24: 0 2401 MHZ PSK mode                       NRZI/NRZIC
25: 1 Attitude control magnetorquers          high/low power
26: 0 Digitalker expt. power                  off/on
27: 0 CCD camera expt. power                  off/on
28: 0 CCD camera expt. integration period     bit 0
29: 0 CCD camera expt. integration period     bit 1
30: 0 CCD camera expt. video amp. gain        bit 0
31: 0 CCD camera expt. video amp. gain        bit 1
32: 0 DSR power                               off/on
33: 0 DSR mode                                read/write
34: 0 DSR mode                                run/reset
35: 0 Radiation detectors geiger-a EHT power  off/on
36: 0 Radiation detectors geiger-b EHT power  off/on
37: 0 Radiation detectors geiger-c EHT power  off/on
38: 0 Electron spectrometer sensor EHT power  off/on
39: 0 DCE experiment power                    off/on
40: 0 DCE expt.                               reset/run
41: 0 DCE expt. prom select                   a/b
42: 0 DCE expt. cpu clock rate select         0.9/1.8 mhz
43: 1 Navigation magnetometer power           off/on
44: 0 Space dust experiment power             off/on
45: 0 Spare dust experiment level select      bit 0
46: 1 BCR status                              0/1
47: 0 435 MHZ downlink modulation select      AFSK/FSK
48: 0 2401 MHZ downlink modulation select     AFSK/PSK
49: 0 1802 serial command                     disable/enable
50: 0 DCE expt serial command                 disable/enable
51: 0
52: 0
53: 0
54: 0 Command watchdog enable
55: 0 Command watchdog reset
56: 0 145 MHZ downlink data select            a
57: 0 145 MHZ downlink data select            b
58: 0 145 MHZ downlink data select            c
59: 0 145 MHZ downlink data select            d
60: 0 145 MHZ downlink data select            e
61: 0 145 MHZ downlink data select            f
62: 0 145 MHZ downlink data rate              a
63: 0 145 MHZ downlink data rate              b
64: 0 435 MHZ downlink data rate              a
65: 0 435 MHZ downlink data rate              b
66: 0 435 MHZ downlink data rate              c
67: 0 Particle/wavecounter control            count/reset
68: 0 Downlink lockout                        enable/disable
69: 0 (spare)
70: 0
71: 0
72: 0
73: 1 P/W channel plate control bit 0
74: 1 P/W channel plate control bit 1
75: 0 P/W channel plate control bit 2
76: 0 Space dust
77: 0 Space dust
78: 0 Space dust
79: 0 Space dust
80: 0 Space dust
81: 0 Space dust
82: 0 Space dust
83: 0 Space dust
84: 0 DSR write cycle complete
85: 0 1802 CWD output
86: 0 1802 tlm port (msb)
87: 0 1802 tlm port
88: 0 1802 tlm port
89: 0 1802 tlm port
90: 0 1802 tlm port
91: 0 1802 tlm port
92: 0 1802 tlm port
93: 0 1802 tlm port
94: 0 1802 tlm port
95: 0 1802 tlm port
96: 0 1802 tlm port (lsb)
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A detailed analysis will appear in the next issue of *ASR*.

Orbit Predictions by KA9Q

Satellite: oscar-9
Catalog number: 12888
Epoch time: 84135.08936496
Mon May 14 02:08:41.132 1984 UTC
Element set: 636
Inclination: 97.5902 deg
RA of node: 109.1397 deg
Eccentricity: 0.0001529
Arg of perigee: 185.8728 deg
Mean anomaly: 174.2484 deg
Mean motion: 15.25613522 rev/day
Decay rate: 4.216e-05 rev/day^2
Epoch rev: 14434
Semi major axis: 6864.046 km
Anom period: 94.388256 min
Apogee: 487.170 km
Perigee: 485.071 km
Beacon: 145.8250 mhz

Satellite: oscar-10
Catalog number: 14129
Epoch time: 84130.85545387
Wed May 9 20:31:51.214 1984 UTC
Element set: 100
Inclination: 25.5752 deg
RA of node: 200.3768 deg
Eccentricity: 0.6092698
Arg of perigee: 269.8549 deg
Mean anomaly: 24.9305 deg
Mean motion: 2.05848786 rev/day
Decay rate: -6e-08 rev/day^2
Epoch rev: 682
Semi major axis: 26186.208 km
Anom period: 699.542624 min
Apogee: 35637.772 km
Perigee: 3826.324 km
Beacon: 145.8100 mhz

Satellite: oscar-11
Catalog number: 14781
Epoch time: 84134.14050737
Sun May 13 03:22:19.836 1984 UTC
Element set: 26
Inclination: 98.2429 deg
RA of node: 196.4397 deg
Eccentricity: 0.0014596
Arg of perigee: 39.2928 deg
Mean anomaly: 320.9333 deg
Mean motion: 14.61859953 rev/day
Decay rate: 1.55e-06 rev/day^2
Epoch rev: 1058
Semi major axis: 7062.392 km
Anom period: 98.504648 min
Apogee: 702.955 km
Perigee: 682.339 km
Beacon: 145.8250 mhz

Satellite: rs-3
Catalog number: 12997
Epoch time: 84132.49292921
Fri May 11 11:49:48.997 1984 UTC
Element set: 94
Inclination: 82.9604 deg
RA of node: 153.4371 deg
Eccentricity: 0.0060213
Arg of perigee: 65.0224 deg
Mean anomaly: 295.7082 deg
Mean motion: 12.15586150 rev/day
Decay rate: 4e-08 rev/day^2
Epoch rev: 10646
Semi major axis: 7987.335 km
Anom period: 118.461369 min
Apogee: 1674.592 km
Perigee: 1578.404 km

Satellite: rs-8
Catalog number: 12998
Epoch time: 84123.06683012
Wed May 2 01:36:14.122 1984 UTC
Element set: 272
Inclination: 82.9621 deg
RA of node: 170.1726 deg
Eccentricity: 0.0017729
Arg of perigee: 244.8032 deg
Mean anomaly: 115.1181 deg
Mean motion: 12.02943778 rev/day
Decay rate: 4e-08 rev/day^2
Epoch rev: 10420
Semi major axis: 8043.236 km
Anom period: 119.706343 min
Apogee: 1696.597 km
Perigee: 1668.078 km

Satellite: rs-4
Catalog number: 13000
Epoch time: 84132.49614255
Fri May 11 11:54:26.716 1984 UTC
Element set: 194
Inclination: 82.9698 deg
RA of node: 161.8617 deg
Eccentricity: 0.0018802
Arg of perigee: 143.8761 deg
Mean anomaly: 216.3567 deg
Mean motion: 12.06669855 rev/day
Decay rate: 4e-08 rev/day^2
Epoch rev: 10566
Semi major axis: 8026.658 km
Anom period: 119.336701 min
Apogee: 1670.926 km
Perigee: 1640.742 km

Satellite: rs-5
Catalog number: 12999
Epoch time: 84133.17398800
Sat May 12 04:10:32.563 1984 UTC
Element set: 166
Inclination: 82.9518 deg
RA of node: 162.8388 deg
Eccentricity: 0.0009636
Arg of perigee: 171.6026 deg
Mean anomaly: 188.5191 deg
Mean motion: 12.05046892 rev/day
Decay rate: 4e-08 rev/day^2
Epoch rev: 10560
Semi major axis: 8033.869 km
Anom period: 119.497425 min
Apogee: 1663.915 km
Perigee: 1648.432 km

Satellite: rs-6
Catalog number: 13002
Epoch time: 84122.49509319
Tue May 1 11:52:56.51 1984 UTC
Element set: 80
Inclination: 82.9634 deg
RA of node: 160.8624 deg
Eccentricity: 0.0051501
Arg of perigee: 103.4771 deg
Mean anomaly: 257.2038 deg
Mean motion: 12.13561344 rev/day
Decay rate: 4e-08 rev/day^2
Epoch rev: 10505
Semi major axis: 7996.222 km
Anom period: 118.659020 min
Apogee: 1679.179 km
Perigee: 1596.816 km

Satellite: rs-7
Catalog number: 13001
Epoch time: 84128.47385621
Mon May 7 11:21:12.56 1984 UTC
Element set: 154
Inclination: 82.9622 deg
RA of node: 162.0113 deg
Eccentricity: 0.0022974
Arg of perigee: 112.6225 deg
Mean anomaly: 247.7263 deg
Mean motion: 12.08680093 rev/day
Decay rate: 4e-08 rev/day^2
Epoch rev: 10535
Semi major axis: 8017.751 km
Anom period: 119.138224 min
Apogee: 1675.973 km
Perigee: 1639.134 km

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